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PROGRAMME TO STRENGTHEN CO-OPERATION AMONG DEVELOPING COUNTRIES IN THE FERTILIZER INDUSTRY

Background paper *

prepared by
the UNIDO Secretariat

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CONTENTS

		Page
	INTRODUCTION	1
I.	THIRD CONSULTATION ON THE FERTILIZER INDUSTRY	4
II.	MEETINGS OF THE BUREAU OF THE THIRD CONSULTATION ON THE FERTILIZER INDUSTRY	7
III.	TRAINING PROGRAMME FOR THE FERTILIZER INDUSTRY	10
IV.	EXCHANGE OF EXPERIENCES IN THE FERTILIZER INDUSTRY PROGRAMME	11
V.	TECHNOLOGICAL CAPABILITIES OF DEVELOPING COUNTRIES IN THE FERTILIZER INDUSTRY PROGRAMME	18
VI.	PRESENTATION OF THE ISSUE TO THE FOURTH CONSULTATION	19

ANNEXURES

A.	THE FIRST CONSULTATION ON THE FERTILIZER INDUSTRY	20
B.	CONCLUSIONS AND RECOMMENDATIONS OF THE EXPERT GROUP MEETING ON REGIONAL CO-OPERATION AMONG DEVELOPING COUNTRIES IN THE FERTILIZER INDUSTRY	21
C.	THE SECOND CONSULTATION ON THE FERTILIZER INDUSTRY	22
D.	CONCLUSIONS AND RECOMMENDATIONS OF THE FIRST MEETING OF THE AD HOC COMMITTEE ON COOPERATION AMONGST DEVELOPING COUNTRIES IN THE FERTILIZER INDUSTRY	25
E.	LIST OF PARTICIPANTS OF THE FIRST INTERREGIONAL MEETING TO EXCHANGE EXPERIENCES IN THE FERTILIZER INDUSTRY	27
F.	LIST OF PARTICIPANTS OF THE FIRST REGIONAL MEETING OF ASIA AND THE MIDDLE EAST	29
G.	LIST OF PARTICIPANTS OF THE FIRST REGIONAL MEETING OF LATIN AMERICA AND THE CARIBBEAN	31
H.	DIRECTORY OF TECHNOLOGICAL CAPABILITIES	33

INTRODUCTION

1. The First Consultation on the Fertilizer Industry held in January 1977 recommended UNIDO to examine opportunities for regional co-operation among developing countries including the international support needed for that co-operation, and to support the programmes of existing regional co-operation groups through technical assistance. (See Annexure A)

2. As follow-up, UNIDO convened an Expert Group Meeting on Regional Co-operation among Developing Countries in Vienna, Austria, in February 1978. The Meeting made a number of recommendations which implementation required UNIDO to take the initiative to organize co-operation among developing countries in this industry. (See Annexure B)

Although UNIDO felt that the initiative should come from developing countries, studies were prepared on ways to ensure adequate supply of fertilizers for least developed countries, and on the identification of potential areas of co-operation on fertilizers. In addition, a working group on co-operation in the phosphate industry was planned but not carried out, due to the poor response to attend at the participant's expense.

3. The Second Consultation on the Fertilizer Industry held in November 1978, considered the progress made by UNIDO on this issue, and the proposal that the initiative should come from participants in selecting the most promissing areas for co-operation, in which UNIDO's support might be required. The Consultation recommended a programme to strengthen co-operation among developing countries in the fertilizer industry, where 10 main areas for co-operation were identified, and that UNIDO should support that programme and establish an ad hoc committee to co-ordinate its implementation. To strengthen co-operation, UNIDO should, as a first step, assist in the establishment of close co-operation between existing regional associations or federations of fertilizer enterprises. The ad hoc committee should be composed of representatives of governmental institutions and regional associations, federations and fertilizer development centres. (See Annexure C)

4. As follow-up on the recommendations, UNIDO convened the first meeting of the Ad Hoc Committee on Co-operation among Developing Countries in the Fertilizer Industry at Nairobi, Kenya in March 1980. The Ad Hoc Committee recommended UNIDO, among others, that priority should be given to the development of the fertilizer industry in Africa, to compile a "Catalogue of technical capabilities available in developing countries", to promote and finance economic co-operation (ECDC) projects in the fertilizer industry requested by developing countries. (See Annexure D)

Other follow-up actions such as the technical Seminar on ammonia technology in China, the convening of an inter-regional meeting of associations of fertilizer producers, the establishment of a fertilizer development centre in Africa, and proposals for training programmes, could not be fully pursued by UNIDO due to lack of resources.

5. The Third Consultation on the Fertilizer Industry held in October 1980, examined the progress made and the difficulties encountered by UNIDO in implementing this issue. After discussing this subject in an enlarged Bureau, the Consultation recommended that UNIDO, in co-operation with the Governments of the developing countries and appropriate international organizations, should initiate and implement a programme of co-operation among developing countries in the fertilizer industry. The programme should devote particular attention to the following three areas: (i) an exchange and transfer of experience, (ii) co-operation in the design, manufacture of equipment, machinery and spare parts and construction of fertilizer plants and (iii) joint ventures for exploitation of reserves of fertilizer raw materials and for the establishment of fertilizer manufacturing facilities.

UNIDO should pursue vigorously the establishment of the programme and its financing, so that implementation could start as soon as possible and form a basis for a continuing activity. The first phase of the programme should be completed within a period of two years.

6. As follow-up on the recommendation, UNIDO convened twice the Bureau of the Third Consultation in May 1981 and May 1983, to advise UNIDO on the implementation of this programme.

The first meeting of the Bureau stressed that the objectives and work programme recommended by the Third Consultation on this issue, should be viewed and dealt with as a unit. Those activities were recommended for the benefit of all developing countries, and should not be confused with customary technical assistance activities. The priorities recommended by the Bureau for the first phase of the programme are the following: training, exchange of experiences and identification of technological capabilities.

7. To implement the training programme, UNIDO carried out a survey on training needs and training facilities in the fertilizer industry of developing countries. Thereafter, arrangements have been discussed with Indonesia to hold the first fertilizer training course for maintenance and operation engineers.

8. Activities on the exchange of experiences programme began when the First Interregional Meeting of the Expert Group to Exchange Experiences in the Construction and Operation of Fertilizer Plants in Developing Countries was convened in Vienna, Austria in December 1981.

Upon its recommendations, the First Regional Meetings of Asia and the Middle East, and Latin America and the Caribbean were held in New Delhi, India and Salvador, Bahia, Brazil respectively during April 1983.

9. On the identification of technological capabilities programme, two surveys were carried out, and a draft directory of technological capabilities existing in developing countries related to the fertilizer industry has been prepared.

I. THIRD CONSULTATION ON THE FERTILIZER INDUSTRY

10. The Third Consultation on the Fertilizer Industry was held at Sao Paulo, Brazil, from 29 September to 2 October 1980. The meeting was attended by 163 participants from 52 countries and 9 international organizations (Report ID/260).

A. Presentation of the issue

11. In presenting the issue, the UNIDO Secretariat reported that due to lack of resources, it had not been possible to implement in full the programme of action recommended by the Second Consultation. (See Annexure C) Action was taken on the following:

(a) A proposal for convening a technical seminar on ammonia-urea technology in China could not be carried out by lack of financing.

(b) A proposal was prepared to co-operate with the OAU in the establishment of a Fertilizer Development Centre in Africa, but no action has been proposed for a similar centre in Asia.

(c) UNIDO, with UNDP support, has initiated a 4 year programme in the Arab countries entitled "regional co-operation programme for the development and promotion of fertilizer production and utilization".

(d) Proposals for training programmes were reviewed internally by UNIDO but no financing for them could be found.

(e) The first meeting of the Ad Hoc Committee on Co-operation among Developing Countries in the Fertilizer Industry was convened by UNIDO in Nairobi, Kenya, in March 1980.

B. Summary of discussions

12. Many participants from developing countries confirmed the importance that they attached to the subject and suggested that it be given priority in discussions at the Third and future Consultations.

The co-operation between OAU and UNIDO discussed at the First Meeting of the Ad Hoc Committee on Co-operation among Developing Countries in the Fertilizer Industry was noted. One participant proposed that efforts should be made to establish a fertilizer development centre for African countries.

13. The Chairman of the Fertilizer Industry Advisory Committee (FIAC) indicated that all fertilizer producers whether in developed or developing countries had common problems and interests and could learn from one another. An indication was given of the willingness of the various fertilizer industry associations represented in FIAC to co-operate with UNIDO within their capability.

The FIAC representative expressed the industry's concern at the substantial proportion of current world fertilizer capacity that was uncompetitive at current prices, and the fact that those prices were below the level required to justify investment in new capacity. A major factor affecting fertilizer prices was the impact of the rising costs of energy.

14. The subject was referred for further consideration to the enlarged Bureau, which suggested a programme to strengthen co-operation among developing countries in the fertilizer industry.

C. Conclusions and recommendations

15. UNIDO, in co-operation with the Governments of the developing countries and appropriate international organizations, should initiate and implement an inter- and intra-regional programme to strengthen co-operation among the developing countries in the fertilizer industry. This programme should heighten the developing countries' awareness of each other's potential in fields of mutual interest and establish a firm basis for increasing their self-reliance.

The programme should devote particular attention to the following three areas:

(a) An exchange and transfer of experience through:

(i) The organization of a number of in-plant training programmes in selected developing countries on plant operation and maintenance;

(ii) The convening of technical meetings at the managerial level on project and plant management, operation problems and technological development;

(iii) The provision of expert services and training facilities on plant and equipment design and on ways to improve capacity utilization;

(b) Co-operation in the design, manufacture of equipment, machinery and spare parts and construction of fertilizer plants through:

(i) The collection and dissemination of information on the availability in developing countries of capacities to manufacture machinery, equipment and spare parts, to provide engineering services and to construct fertilizer plants;

(ii) An investigation of the feasibility of manufacturing standard and specialized equipment for the fertilizer industry;

(iii) The organization of expert group meetings to advise on opportunities for specialization in the manufacture of standard equipment and machinery for fertilizer plants;

(c) Joint ventures for exploitation of reserves of fertilizer raw materials and for the establishment of fertilizer manufacturing facilities through:

(i) A survey of available reserves of fertilizer raw materials for joint exploitation;

(ii) A survey of the developing countries interested in establishing joint fertilizer manufacturing facilities;

(iii) An expert group meeting to exchange experience in technical, financial and legal aspects of joint investment in the fertilizer industry;

(iv) Assistance in preproject investigation and assessment of the techno-economic viability of identified joint projects.

UNIDO should pursue vigorously the establishment of the above programme and its financing so that implementation could start as soon as possible and form a basis for a continuing activity. That first phase of the programme should be completed within a period of two years.

II. MEETINGS OF THE BUREAU OF THE THIRD CONSULTATION ON THE FERTILIZER INDUSTRY

16. The Bureau of the Third Consultation was convened twice in Vienna, Austria, 26-27 May 1981 and 3 May 1983 respectively, to advise UNIDO on the implementation of the programme to strengthen co-operation among developing countries in the fertilizer industry.

First Meeting of the Bureau

17. UNIDO presented five programmes it identified within the programme to strengthen co-operation among developing countries in the fertilizer industry, recommended by the Third Consultation. It was stressed that the programmes do not review standard technical assistance activities, nor repeat traditional technical points; it concentrates on the new aspects derived from the Consultations on this industry.

The five programmes were the following: training, exchange of experiences, identification of technological capabilities, fertilizer raw materials and investment promotion, and repair and maintenance of fertilizer plants.

18. The Bureau, after discussing the context of the above programmes, stressed that UNIDO should not lose sight of the objectives and work programme recommended by the Third Consultation, which should be viewed and dealt with as a unit. It recommended as phase I of the programme of co-operation the following:

(a) Training - There should be two types of training (general and in-plant) given to two categories of personnel (managers and shift operators).

(i) General training, comprises formal theoretical and practical courses of limited duration to be given regularly.

(ii) In-plant training is a practical on-the-job training offered by efficient fertilizer producers according to the needs of other developing countries, preferably in plants of similar size and technology.

(iii) Managers' training, usually carried out during the construction of a fertilizer plant at two stages:

- at pre-contracting period, comprising plant visits to collect information on well operated plants willing to collaborate.

- at pre-commissioning stage, after the training period often provided by the plant contractor.

(iv) Shift operator training, comprising both standard on-the-job operator training before plant commissioning, and refreshing/up-dating training for established operators.

Training for repair and maintenance personnel customarily includes a general training of larger duration and in-plant training at equipment suppliers' facilities.

(b) Exchange of experiences, that is closely linked to training should include the following:

(i) Exchange of experiences at manager level in country, regional and interregional group meetings. The results of those meetings should be disseminated to other developing countries that could not participate in them.

(ii) Attendance to the regular meetings of plant constructor's clubs where plant buyers gather to exchange information and experiences on operational problems of their new plants.

(iii) Exchange of experiences on repair and maintenance problems.

(iv) Exchange of experiences among countries having similar fertilizer raw material problems.

(v) Exchange of experiences with developed countries on plant operation problems and latest technological developments by enabling participants from developing countries to attend the international meetings where those problems are discussed.

(c) Identification of technological capabilities, should concentrate on making an inventory of capabilities existing in the developing countries. The inventories should be elaborated from published sources and surveys to be carried out with Industry Associations and Goverment Institutions.

The inventories should include:

(i) Listings of operating, under construction and planned fertilizer plants in developing countries. The listings should be complemented by country summaries to provide up-dated information about on-going activities in fertilizers. Thereafter, the more advanced developing countries may make their own programmes to directly help other developing countries.

(ii) A directory of technological capabilities existing in the developing countries, such as plant design, vendors of equipment and engineering contractors, etc. This directory should be made with the co-operation of individual countries and from published sources.

(iii) A fertilizer raw materials survey from published sources to identify those reserves suitable for joint exploitation.

Second Meeting of the Bureau

19. UNIDO presented a progress report on the implementation status of the phase I programmes. After examining the achievements and difficulties encountered, the Bureau recommended that the central theme of the Fourth Consultation should be the programme of economic co-operation among developing countries in the fertilizer industry, with practical examples of co-operation at plant level. The programme should be further developed along the following three main lines:

(a) training of personnel in the more experienced developing countries;

(b) exchange of experiences among developing countries on a regular basis;

(c) expert assistance to other developing countries, using UNIDO as a forum for stimulizing them.

Further, to foster the more challenging co-operation in joint venture projects up to expertise to manage a whole fertilizer plant for a specified period.

20. The Bureau also recommended that UNIDO should continue the preparation of a Directory of Technological Capabilities of developing countries related to fertilizers. In addition, two background papers for the Fourth Consultation should be prepared:

(a) a paper on the mechanisms and funding required to implement the recommendations of the Third Consultation, including funding problems and the various sources of funds available to UNIDO;

(b) a paper on new technological developments in developing countries, including waste and pollution technologies.

III. TRAINING PROGRAMME FOR THE FERTILIZER INDUSTRY

21. A survey on training needs and training capabilities in developing countries was carried out in 1981. The survey covered 45 countries identified as needing training and 6 countries having training capabilities. Positive response was received from 20 countries in the former group and from 4 countries in the latter group. Indonesia was selected as host for the first In-Plant Group Training Programmes for Technical and Supervisory Staff of Fertilizer Industries (Nitrogen) from developing countries.

22. To organize the first in-plant training programmes, PUSRI's Training Centre at Palembang, Indonesia was visited in March 1982. Two draft project concepts were prepared and discussed with PUSRI, covering training for plant maintenance engineers and plant operation engineers. The programmes would be available for 10 to 15 trainees for a duration of 4 to 5 weeks. UNIDO would cover the international travel of the participants and Indonesia would cover the cost of the course and local expenses of the participants.

23. After an internal review of this programme, PUSRI was requested to send one staff member to attend the next UNIDO Training Workshop on Fertilizers to be held in Moscow, USSR, from 5 April to 3 July 1984. In addition, PUSRI's future training director would undertake a study tour to visit various fertilizer institutions which have experience in organizing training courses such as the one mentioned above. The first in-plant group training programme on fertilizers is scheduled to take place early in 1985 at Palembang, Indonesia. Based on this experience, other potential host countries would be approached in the future.

IV. EXCHANGE OF EXPERIENCES IN THE FERTILIZER INDUSTRY PROGRAMME

A. First Interregional Meeting

24. In order to define the scope and content of this programme, UNIDO convened the First Interregional Meeting to exchange Experiences in the Construction and Operation of Fertilizer Plants in Developing Countries, which took place in Vienna, Austria, 7-11 December 1981. The Meeting was attended by participants from 9 developing countries of Asia, Latin America and the Middle East. Regrettably, at the last moment Africa could not participate, but this region will be invited to attend all future meetings (report UNIDO/PC.30). The list of participants to this Meeting is given in Annexure E.

25. The Meeting discussed the identification of problem areas in the construction and operation of fertilizer plants, and embodied its experience in the form of effects on implementation and operation of fertilizer plants.

Conclusions and recommendations

26. The Meeting identified that many problems in the construction and operation of fertilizer plants were common in the experience of the participants. Therefore it was felt that periodic exchange of experiences would be useful and should be organized by UNIDO.

27. The Meeting recommended that the exchange of experiences among fertilizer producers in developing countries should be carried out through:

(a) regional and interregional meetings of plant and project managers,
(b) plant visits including training,
(c) exchange of reports and documentation.

28. The meetings of plant managers and project managers should be carried out as follows:

(a) annual regional meetings, consisting of 10-12 participants from operating plants in each region, which shall last for one week and include plant visits;

(b) the first two regional meetings of Asia and the Middle East, and Latin America and the Caribbean respectively, should take place late in 1982. The agenda for each regional meeting was already selected by their respective participants.

(c) The interregional meetings should be held biannually in Vienna, Austria, and the agenda for discussions is to be proposed by the regional meetings, an equal number of topics being proposed by each region. The second meeting shall take place late in 1983, and shall include 12-15 participants, contributed in equal numbers by each region.

29. The Meeting recommended that UNIDO makes arrangements for exchanging experience through plant visits and makes provision for financing plant visits for up to 10 persons per year, on the understanding that if the demand was greater than this, the interested party would finance it itself. It was ascertained that the hosting of plant visits up to 2 weeks should pose no major problem concerning the meeting of local expenses by the host organization.

30. Regarding training programmes of longer duration, the Meeting recommended UNIDO to contact the more experienced fertilizer producing countries in order to ascertain their willingness to host training programmes for 10-15 participants once every two or three years. The training programmes should be of three types for the duration suggested below:

(a) Training of operators and their supervisor from countries that have recent or no experience in fertilizer production (8 weeks).

(b) Training of maintenance crews from countries having maintenance problems (8 weeks).

(c) Training of middle management (2 to 3 weeks).

31. The Meeting felt it would be useful and appropriate to exchange experience through distributing reports and documentation on technical matters to the plant manager of all fertilizer plants in developing countries on the UNIDO roster, and recommended that the Negotiations Branch of UNIDO act as a focal point for their activity.

B. First Regional Meetings of Asia and the Middle East and Latin America and the Caribbean

32. The First Regional Meeting of Asia and the Middle East to exchange Experiences in the Construction and Operation of Fertilizer Plants, was convened at New Delhi, India, 4-9 April 1983. It was attended by 16 participants from 12 countries and observers from India. The list of participants is given in Annexure F.

33. The First Regional Meeting of Latin America and the Caribbean to exchange Experiences in the Construction and Operation of Fertilizer Plants was held at Salvador, Bahia, Brazil, 18-23 April 1983. It was attended by 12 participants from 10 countries. The list of participants is given in Annexure G.

Presentation of the topic

34. In presenting the topic to both regional meetings, UNIDO stressed the exploratory nature of these first meetings in order to find out the actual problems and achievements of their regional fertilizer industry, and how the real needs of project teams and operating plants could be met by mutual co-operation.

35. Three main types of participants were attending the meetings, namely project/country participants without fertilizer plants, relatively experienced producers (less than 8 years of experience), and experienced producers.

36. Project/country participants were requested the following:

(a) to present the current status of the fertilizer project or country situation;

(b) to indicate the main problems they are facing, and on which areas they would like feedback and advice from more experienced participants;

(c) on its turn, more experienced participants may be expected to pinpoint those points and areas where the presented fertilizer projects could be further strengthened. Further, participants may provide practical advice on the areas requested in (b) above, including alternative ways for solving the project's problems and sources of expertise (engineering services and equipment).

37. Relatively experienced producers were requested the following:

(a) to present their company/country fertilizer situation, and the experiences (problems and solutions) they have faced in their allocated agenda item. In addition, to outline planned future activities in their area, indicating those items where feedback and advice from other participants may be required;

(b) on its turn, other participants may be expected to pinpoint those points and areas where further strengthening may be warranted in their experience. Further, participants may provide practical advice for solving still outstanding problems and/or to achieve a more efficient solution on current procedures, and indicate sources of expertise.

38. Experienced producers were requested the following:

(a) to present an overview of current procedures in their allocated agenda item, indicating the main problems faced and the evolution of solutions they tried out to solve those problems, stressing the appraisal of what worked and what did not work fully to their satisfaction.

(b) to outline planned activities in their agenda item, indicating which difficulties or problem areas they envisage to be found upon implementation.

39. UNIDO would endeavour to support the above activities, in particular on additional sources of expertise in developing countries, but including as well some developed countries for solving special problems.

In addition, UNIDO would endeavour to facilitate the actual implementation of solutions for identified problems through technical assistance and other means, according to its possibilities and in close co-ordination with the parties involved.

Summary of discussions

40. Participants at both regional meetings presented their respective technical papers, after each of which lively technical discussions ensued. However, time limitations and the disparity of technologies and of expertise in different fertilizer products, precluded a more thorough and hence, interesting discussion involving all participants.

41. Participants' appraisal of the meetings and commentary for further improvements on future meetings were the following:

(a) It took some time to grasp the different nature of this type of meeting from other meetings such as workshops, symposium, etc. Participants unanimously stressed the great usefulness of the meeting and the high spirit of co-operation and frankness developed during the discussions.

(b) It was stressed that the meeting provided a unique opportunity to meet other people who are facing similar problems, and by discussing different approaches for solving the same problem, new ideas or methods could be evolved. These new ideas would help to obtain a more efficient solution to pressing problems, enabling its early implementation with the corresponding savings in time and cost.

(c) To facilitate the exchange of experiences, participants at each meeting should provide information on their company/country capabilities, stressing its stronger points and needs, in order to promote the possibility of future contacts for mutual assistance. In other words, to know whom to call to when problems arose. In particular, to use the experience of established fertilizer producers to appraise which types of plants have proven to be more technically and economically suitable for other developing countries, and avoid wasting money unnecessarily. In this regard, the relationship between technological complexity and mastery of the plant on operation and maintenance should be optimized.

(d) To facilitate the flow of experiences and information, and its absorption and application for solving real problems, the agenda items should be more sharply focused to obtain more detailed information for direct use in the plant. In particular, the duration of the meetings should be extended to include more days both for discussions and for plant visits in order to observe the practical application of solutions.

(e) To facilitate technical exchanges, informal technology clubs may be formed and co-ordinated by UNIDO. These clubs should include companies using the same technology but applied in different countries, because despite using the same process there are specific differences in each plant.

These exchanges should be complemented with experiences on in-plant training and basic engineering design for new plants. The use of language common to the parties was also stressed.

(f) To support the programme on exchange of experiences, UNIDO could establish an information network on the fertilizer industry in developing countries. This network could contain the name and addresses of fertilizer companies, equipment vendors, engineering contractors, etc. of developing countries. In addition, information on the actual parameters or indexes used in experienced companies/countries in the construction and operation of their fertilizer plants, should be exchanged to be used as practical references by operating companies and project teams.

Conclusions and recommendations

42. The Meetings discussed and exchanged information on problems and solutions that worked in the experience of the participants. Participants felt that the exchange of experiences was very useful and beneficial for their companies and projects, and they strongly recommended that UNIDO should continue holding such meetings on a regular basis.

43. The Meetings recommended that future participation in these meetings be limited to around 12 participants from operating plants and projects in the region. The meetings should last ten days including three days of plant visits arranged about mid-way of the entire duration.

44. Each regional meeting selected its own agenda and suggested venues for holding their respective second regional meeting by mid-1984. Participants from Africa recommended that a regional meeting of Africa to exchange experiences in the construction and operation of fertilizer plants be convened in March, 1984. The agenda for the meeting should be similar to the agenda for the first regional meeting of Asia and the Middle East. The suggested venue of this meeting would be Algeria, Morocco or Tunisia. UNIDO should address an invitation to host this regional meeting to the above countries, including a plant visit. The meeting should be conducted in English and French to enable a broader and more representative participation.

45. The Meetings recommended that the second interregional meeting to exchange experiences in the construction and operation of fertilizer plants be convened late in 1984, after all three developing countries' regions have held their respective regional meetings.

46. The Meetings recommended that UNIDO should make the necessary arrangements for the above regional and interregional meetings and urged that invited participants might consider the possibility of defraying their own international travel. UNIDO and the host countries should endeavour to meet the local expenses of the participants.

47. The Meetings recommended that UNIDO should foster exchange of experiences through distributing reports and documentation on technical matters to all fertilizer plants and project managers in developing countries on the UNIDO roster.

48. The Meetings recommended that the technological capabilities of developing countries related to the fertilizer industry be made known to all developing countries in order to stimulate its use whenever possible. Participants agreed to assist UNIDO in completing the Directory of Technological Capabilities on this industry which is currently under preparation.

49. The Meetings recommended that to facilitate the training of personnel for new fertilizer plants and other fertilizer plants as required, few trainees at a time may be taken in for on-the-spot training at well operating plants in experienced developing countries. The meeting of local expenses of trainees may be favourably considered.

50. Participants agreed to comment on studies and other work done by UNIDO on fertilizers to enable UNIDO to better meet the specific requirements of most developing countries.

V. TECHNOLOGICAL CAPABILITIES OF DEVELOPING COUNTRIES IN THE FERTILIZER INDUSTRY PROGRAMME

51. Upon the recommendations of the Second and Third Consultation on the Fertilizer Industry and on the advice of the Bureau of the Third Consultation, work began on the identification of technological capabilities existing in developing countries related to the fertilizer industry.

52. A pilot field survey of the five Andean Group countries was carried out in June 1982, to ascertain the range of capabilities and achievements of the fertilizer industry in these countries. It was found out that most of the achievements pertain more to the exchange of experiences programme rather than to this programme. Further, most of the existing capabilities in engineering contracting, equipment manufacture, etc. were of a general nature and not fully proven by their fertilizer industry.

53. The pilot survey showed that the time and cost of undertaking an in-depth coverage of proven fertilizer-related capabilities in a representative number of developing countries was well above budget. Therefore, it was felt that a survey of 30 developing countries coupled to a search of information available in UNIDO, would suffice, at this stage, to prepare a draft directory of technological capabilities as well as to show the interest of the surveyed countries in presenting their own capabilities in fertilizers. To date, information has been received from 17 countries. The countries surveyed and the response obtained are presented in Annexure H.

54. The draft directory of technological capabilities in developing countries related to the fertilizer industry has been compiled using the responses to questionnaires and supplemented by other information available in UNIDO. It contains information on the following six areas: training facilities, processes available for transfer, fertilizer producing companies, engineering contractors, equipment manufacturers and raw materials.

55. The purpose of the directory is to facilitate co-operation among developing countries by making up-dated and authoritative information in these areas readily available to countries planning, developing or expanding their fertilizer industries.

VI. PRESENTATION OF THE ISSUE TO THE FOURTH CONSULTATION

56. Upon the recommendations of the Bureau of the Third Consultation and of the various expert group meetings convened during implementation, UNIDO is presenting to the Fourth Consultation, within the issue of co-operation among developing countries in the fertilizer industry, the following:

(a) A report to the Fourth Consultation presenting the results obtained in phase I of this issue, on the following priority programmes:

(i) training programme for the fertilizer industry

(ii) exchange of experiences in the fertilizer industry programme

(iii) technological capabilities of developing countries in the fertilizer industry programme.

(b) A draft directory of technological capabilities in developing countries related to the fertilizer industry.

(c) A request for advice about follow-up activities and practical implementation for phase II of the issue, including continuing activities from phase I.

57. The additional background papers recommended by the Bureau in para. 20, items a and b, could not be prepared on time.

ANNEXURE A

THE FIRST CONSULTATION ON THE FERTILIZER INDUSTRY

Vienna, Austria, 17-21 January 1977 (Report ID/WG.242/8/Rev.1)

Recommendations on opportunities for regional co-operation between developing countries

1. The Consultation recognized that the installation of fertilizer plants and the establishment of a marketing and distribution network would be easier in developing countries that had large fertilizer markets. In countries with smaller markets, it would be desirable to plan for regional co-operation and a combination of resources and skills. The opportunities for broader co-operation between all developing countries should also be pursued.

2. The Consultation reviewed the efforts that had already been made, including existing regional co-operation arrangements, and expressed its support for those efforts. It recommended that they should be intensified and that:

(a) High priority should be given in the programmes of those regional groups to the preparation of feasibility studies, the setting up of fertilizer plants, and the building up of a marketing and distribution network within each region;

(b) UNIDO should extend technical and professional assistance to those regional co-operative efforts and should provide consultancy services in response to requests, and should follow-up the suggestions made at the Consultation;

(c) UNIDO should consider giving assistance to establish regional development centres for the fertilizer industry;

(d) International technical and financing assistance from bilateral and other sources should also be made available for such regional group efforts.

ANNEXURE B

CONCLUSIONS AND RECOMMENDATIONS OF THE EXPERT GROUP MEETING ON REGIONAL CO-OPERATION AMONG DEVELOPING COUNTRIES IN THE FERTILIZER INDUSTRY

Vienna, Austria, 8-10 February 1978 (Report ID/WG.265/11/Rev.1)

To examine this issue recommended by the First Consultation, UNIDO convened the above Expert Group Meeting. Participants from 14 developing countries attended the Meeting and reached the following main conclusions and recommendations:

(a) There were specific project opportunities which would use natural gas, phosphate or potash resources of one country to supply the fertilizer markets of other countries. When requested, UNIDO should take action to promote these projects;

(b) UNIDO should convene a working group to promote co-operation among developing countries in the phosphate fertilizer industry;

(c) UNIDO should make a study of ways of ensuring an adequate supply of fertilizers for least developed countries and other developing countries with a small population;

(d) International, regional and bilateral financial institutions should continue to use their financing to support fertilizer projects which enhance co-operation between developing countries;

(e) UNIDO should assist regional organizations of fertilizer producers and bring together all regional associations and encourage their objectives;

(f) UNIDO and other international organizations should assist sub-regional groups in formulating proposals for co-operation in implementing their fertilizer projects;

(g) UNIDO should contribute to the financing of the new Regional Fertilizer Information and Advisory Services project sponsored by ESCAP, FAO and UNIDO. The establishment of similar projects in other regions could also be supported by UNIDO if they are requested;

(h) Fertilizer development centres should be established in some regions to provide training, trouble-shooting, information and other common services;

(i) UNIDO should involve experts from developing countries in its consultancy/advisory service for the fertilizer industry. A detailed proposal on the formation and functions of the service should be presented to the Second Consultation. For this purpose UNIDO should prepare a roster of persons and organizations able to produce such services;

(j) UNIDO should publish a directory of all fertilizer producers in developing countries and disseminate other up-to-date information of interest to fertilizer manufacturers on a regular basis, inter

ANNEXURE C

THE SECOND CONSULTATION ON THE FERTILIZER INDUSTRY

Innsbruck, Austria, 6-10 November 1978 (Report ID/211)

Recommendations on a programme to strengthen co-operation between developing countries on the fertilizer industry

1. The Consultation noted that, because of their similar level of development, the developing countries ought to be in a good position to confer and exchange experience and expertise. It was felt that there should be proper co-ordination between developing countries in order to cover the exchange of views on handling specific problems regarding planning and formulation of new projects, contracting for procurement and construction, commissioning and trouble-shooting, maintenance and product distribution, management etc. It was also felt that technical assistance might be an important form of co-operation between developing countries, not only in any of the above areas, but also for training purposes at all levels.

2. While sharing of experience and other limited resources was an important component of co-operation between developing countries, the collective approach to any of the problems faced by those countries in developing their fertilizer industry could help them in obtaining improved facilities such as better information resources, improved training programmes, more detailed technical seminars, etc.

3. The Consultation recommended that in order to strengthen co-operation between developing countries in all matters relating to the fertilizer industry, UNIDO should, as a first step, assist in the establishment of close co-operation between existing sub-regional, regional and interregional associations or federations of fertilizer enterprises and fertilizer industry development centres concerned with the development of the industry in the developing countries. It was suggested that UNIDO should assist and support the establishment of regional fertilizer industry research and development centres, federations or associations of fertilizer enterprises in regions where they did not exist.

4. To further those objectives, UNIDO was requested:

(a) To prepare, publish and widely disseminate an information booklet containing a brief account of, and statistical data relating to the activities of:

(i) All sub-regional, regional and interregional federations, associations, and fertilizer industry development centres established in the developing countries;

(ii) All international organizations, institutions, agencies and fertilizer development centres concerned with the fertilizer industry including those in developing countries interested in providing consultancy services;

(b) To help to organize periodically interregional meetings of representatives from sub-regional, regional and interregional federations, associations and fertilizer industry development centres to review current activities and propose new activities and projects of co-operation;

(c) To organize workshops on different aspects of technical management of fertilizer plants in which the experience of fertilizer plants in different countries could be exchanged;

(d) To initiate action for organization of training programmes for fertilizer personnel from developing countries making full use of the existing training facilities in developing countries. The training should cover areas such as project implementation, operation, technical management and maintenance of fertilizer plants;

(e) To assist regional organizations to establish a maintenance improvement programme that would improve capacity utilization in fertilizer plants in developing countries. The programmes should include preparation of improved maintenance manuals, introduction of new techniques of maintenance such as preventive maintenance through non-destructive testing instruments, management of spare parts, etc. The experience of developing countries having fertilizer plants should be drawn upon in preparing the programme;

(f) To organize visits of fertilizer personnel of developing countries to the plants of other developing countries with more experience in the fertilizer sector;

(g) To examine the possibility of establishing a regional pool of common spares for fertilizer plants at the sub-regional or regional level;

(h) To stimulate an exchange of technical information between regions by inviting the co-operation of sub-regional, regional and interregional federations, associations and development centres;

(i) To assist the development of new fertilizer projects in developing countries based on raw materials and market potential of the region. Assistance might be given in investigating such technical aspects as quantity and quality of raw materials (e.g. phosphate rock and potash) and in carrying out a techno-economic study of the project including market and transport;

(j) In collaboration with UNCTAD and FAO, to encourage production and consumption of fertilizer products and promote interregional trade in raw materials, intermediates and finished fertilizer products.

Recommended programme for immediate action

5. UNIDO should assist in organizing in 1979 a technical seminar in a developing country inviting fertilizer producers and contractors to discuss fertilizer technology for ammonia and urea, and N-P-K granulation plants.

6. UNIDO should assist, upon request, in arranging an annual interregional meeting starting in 1979 for regional associations, federations and regional groups, and fertilizer industry development centres to co-ordinate their approaches. Each group is to report on its own activities and on the fertilizer supply and demand situation in their regions, plans for new plants to be built. A number of technical subjects of common interest could be considered.

7. UNIDO should start promoting the formation of regional groups in areas, such as Africa, where such groups do not presently exist. Specifically, UNIDO in co-operation with the OAU should render support to the establishment of a Fertilizer Development Centre in Africa as requested by the African delegations at the Second Consultation on the Fertilizer Industry. UNIDO should consider giving support to the establishment of a similar centre in Asia.

8. The Consultation recommended that UNIDO should establish an ad hoc committee with the following terms of reference:

(a) To co-ordinate the implementation of the programme recommended by the Consultation;

(b) To study in depth additional areas for co-operation between developing countries, not covered by the present report, and to recommend action.

The ad hoc committee would initially be composed of representatives of the following: governmental institutions, and regional and interregional associations, federations and fertilizer industry development centres. The membership might be increased later if necessary. The committee should meet annually.

ANNEXURE D

CONCLUSIONS AND RECOMMENDATIONS OF THE FIRST MEETING OF THE AD HOC COMMITTEE ON COOPERATION AMONGST DEVELOPING COUNTRIES IN THE FERTILIZER INDUSTRY

Nairobi, Kenya, March 1980 (Report ID/WG.322/2)

Having reviewed the Programme of Action recommended by the Second Consultation and having considered additional areas of co-operation, the Committee felt that efforts should be concentrated on the following limited range of activities so that practical results can be achieved quickly:

(a) Co-operation for the development of the fertilizer industry in Africa should be given first priority.

(b) Co-operation should be extended to the Governments of African States and to the Inter-African Fertilizer Committee of the OAU:

(i) to develop, co-ordinate and implement national and sub-regional fertilizer industry development plans;

(ii) to establish and operate an African Fertilizer Development Centre;

(iii) to prepare for the creation of an African Association of Fertilizer Producers.

(c) Request UNIDO to compile, up-date annually and circulate to all developing countries a "Catalogue of Technical Capabilities available in Developing Countries" which describes the specific areas in the development of the fertilizer industry in which developing countries have sufficient experience and technical competence to offer co-operation to other countries; the first issue should be completed by end-1980.

(d) Request UNIDO to promote and finance ECDC project in the fertilizer industry requested by developing countries and to discuss with the Government of those developing countries which have an established fertilizer industry the contributions they might make;

(e) Request UNIDO to prepare and distribute well in advance a comprehensive list of the technical seminars and training programmes organized in developing countries and to prepare detailed proposals covering the years 1981-1983 that would facilitate a much greater exchange of experience among developing countries.

(f) Request UNIDO to prepare for consideration of the Third Consultation on the Fertilizer Industry proposals for strengthening both technical and economic co-operation among developing countries taking into account:

(i) the activities of existing national, regional and international associations of fertilizer producers in developing countries;

(ii) the formation of regional associations of fertilizer producers in Africa and Asia as recommended by the Committee;

(iii) the proposal that a Developing Countries' Association of Fertilizer Producers be formed.

(g) Suggest that the Committee be converted into a Permanent Committee meeting annually, that the next meeting be held in 1981 and that in the interim period the Chairman and three Vice-Chairmen assist the UNIDO Secretariat in implementing the above programme.

ANNEXURE E

LIST OF PARTICIPANTS OF THE FIRST INTERREGIONAL MEETING TO EXCHANGE EXPERIENCES IN THE FERTILIZER INDUSTRY

Vienna, Austria, 7-11 December 1981

BANGLADESH

Mr. Ejaz R. CHAUDHURY
Project Director
Chittagong Urea Fertilizer Ltd.
Dacca

BRAZIL

Mr. Newton Lima de Freitas GUIMARAES
Technical Director of Nitrofertil
Petrobras Government Group
Salvador-Bahia

INDIA

Mr. K.S. SARMA
Chairman and Managing Director
Projects and Development India Ltd.

INDONESIA

Mr. Effendi DAUD
Executive Secretary
Fertilizer and Petrochemical Manufacturer's Association of Indonesia
Jakarta

Mr. SUARDIN
Operation Manager
P.T. PUSRI
Palembang

KUWAIT

Mr. Mohammed L. MIGHARBIL
Operation Manager
Petrochemical Industries Co. K.S.C.
Ahmadi

MEXICO

Mr. José Camarena RAMIREZ
Subgerente de proyectos
FERTIMEX

PERU

Mr. Juan Guerrero FOWKS
Jefe depto. fertilizantes
Petroperu
Lima

TURKEY

Mr. Güngör CANKARA
Mech.Eng.M.S.
Azottas
Ankara

VENEZUELA

Mr. Rolf BECKER B.
Coordinador de Asistencia Tecnica
Petroquímica de Venezuela S.A.
Pequiven
Caracas

ANNEXURE F

LIST OF PARTICIPANTS OF THE FIRST REGIONAL MEETING OF ASIA AND THE MIDDLE EAST

New Delhi, India, 4-9 April 1983

ALGERIA

Mr. Belkebir MOULOUD
Directeur, Petrochimie Engrais
SONATRACH
Arzew

BANGLADESH

Mr. Akm Abdul MATIN
General Manager
Potash Urea Fertilizer Factory
Dhaka

CHINA

Mr. Hua Ke QIANG
Engineer
Dong Ting Nitrogen Fertilizer Plant
Hunan Province

INDIA

Mr. A.D. MAJUMDAR
General Manager (Engineering)
Projects and Development India Ltd.
Bihar

Mr. D.N. BHOWMIK
Adviser (Fertilizer)
Ministry of Chemical and Fertilizers
New Delhi

INDONESIA

Mr. Ahmad UMAR
Procurement Manager
P.T. PUSRI
Palembang

Mr. Gunawan SUWARDI
Operation Manager
P.T. PUSRI
Palembang

KOREA, Republic of

Mr. K.P. CHAE
Plant Manager
Namhae Chemical Corporation

KUWAIT

Mr. Samir M. AWAD
Process Area Engineer (Urea)
Petrochemical Industries Co. K.S.C.
Ahmadi

NIGERIA

Mr. Emman E. OPUWARIBO
Soil Scientist
University of Science and Technology
Port Harcourt

PAKISTAN

Mr. Nazir AHMED
General Manager
Pak-American Fertilizer Ltd.
Iskanderabad

Mr. Abdul Majid KHAN
General Manager
Hazara Fertilizer Complex
Rawalpindi/Haripur

SAUDI ARABIA

Mr. Ahmad QIDWAI
General Manager
Saudi Arabian Fertilizer Co.
Dammam

Mr. Talat A. ANBAR
Marketing Division Manager
Saudi Arabian Fertilizer Co.
Dammam

THAILAND

Mr. Pairoj PUNYAVUT
Thai Central Chemical Co. Ltd.
Bangkok

ZIMBABWE

Mr. Michael HALL
Technical Manager
ZFC Ltd.
Harare

ANNEXURE G

LIST OF PARTICIPANTS OF THE FIRST REGIONAL MEETING OF LATIN AMERICA AND THE CARIBBEAN

Salvador, Bahia, Brazil, 18-23 April 1983

ANGOLA

Ms. Bernarda Gonzalvez M. ANAPAZ
Jefe del Departamento de Desenvolvimento Industrial
Ministério da Indústria da R.P. Angola
Luanda

ARGENTINA

Mr. Miguel H. Sanchez ORTIZ
Gerente de Producción
Petrosur S.A., Planta Compana
Buenos Aires

BOLIVIA

Mr. Edmundo SALVATIERRA
Jefe de la División de Proyectos
Yacimientos Petrolíferos Fiscales Bolivianos
Cochabamba

BRAZIL

Mr. Virgílio Vitória Xavier de MORAIS
Gerente de Engenharia
Norfértil S/A
Rio de Janeiro

Mr. José Alberto M. FRANCO
Gerente Geral da Fábrica
Nitrofértil S/A
Camaçari-Bahia

COLOMBIA

Mr. Victor Thowinsson LINERO
Superintendente Mecánico de Fertilizantes
Monómeros Colombo-Venezolanos
Barranquilla

COSTA RICA

Mr. Gerardo Alvarado AVILA
Director de Producción
Fertilizantes de Centro América S/A (Costa Rica)
San José

MEXICO

Mr. Jesus Perez CASADOS
Superintendente General
Fertilizantes Mexicanos S/A
Coatzacoalcos

MOZAMBIQUE

Mr. Josephat Jose DIMAKA
Coordenador do Projeto Pande
Maputo

PERU

Mr. Felix Pezan ORTIZ
Gerente del Departamento de Fertilizantes
Petróleos del Perú S/A
Talara

TRINIDAD AND TOBAGO

Mr. Piggott REY
Ammonia Operations Manager
Fertilizers of Trinidad and Tobago Ltd.

Mr. Vicente F. ESTRADA
Vice President
Management Training Systems
St. Louis

ANNEXURE H

SURVEY ON TECHNOLOGICAL CAPABILITIES

COUNTRY	ANSWER TO QUESTIONNAIRE		
	YES	NO	PROMISED REPLY BUT NO ANSWER RECEIVED
ALGERIA			X
ARGENTINA			x
BANGLADESH	X		
BRAZIL		X	
CHILE	X		
CHINA	X		
COSTA RICA		X	
CUBA	X		
EGYPT		X	
GUATEMALA	X		
INDIA	X		
INDONESIA	X		
JAMAICA		X	
JORDAN		X	
KENYA	X		
KOREA, Rep. of	X		
MALAYSIA			X
MEXICO		x	
MOROCCO		X	
NIGERIA		X	
PAKISTAN	X		
PHILIPPINES	X		
SENEGAL		X	
SYRIAN ARAB REPUBLIC	X		
TANZANIA, United Republic of	X		
THAILAND	X		
TRINIDAD AND TOBAGO	X		
TUNISIA	X		
TURKEY	X		
ZIMBABWE		X	

Note: This survey does not include the five Andean Group countries which were included in the pilot survey.